

### Remarks

Reconsideration of the application and allowance of all pending claims are respectfully requested. **Applicants respectfully request that the Examiner carefully consider these remarks, in light of the new art cited after final.** Claims 1, 3-21, 23-42 and 44-54 remain pending.

In the Office Action, dated July 22, 2004, claims 1, 3-5, 10-16, 18-21, 23-25, 30-34, 36-42 and 44-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galbraith et al. (U.S. Patent No. 5,265,240) in view of Gutta et al. (U.S. Patent No. 6,122,693) or Patterson (U.S. Patent No. 4,149,241); claims 6-7, 17, 26-27 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Galbraith in view of Gutta and Blasciak (U.S. Patent No. 4,845,615) or in view of Patterson and Blasciak; and claims 8-9 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Galbraith, Gutta and LANQuest by Novell<sup>®</sup>, or the combination of Galbraith, Patterson and LANQuest by Novell<sup>®</sup>. Applicants respectfully, but most strenuously, traverse these rejections for the reasons below.

In one aspect, applicants' invention is directed to measuring the utilization of individual components of channels. That is, a channel has a plurality of individual components and each selected individual component is monitored and measured to determine the utilization of that particular component of the channel. This is advantageous because the modern channels, such as FICON channels, are able to multiplex many I/O operations at the same time and can pipeline the execution of channel programs, and thus, measuring the utilization of individual components of a channel facilitates planning for those channels. Further details regarding a channel that has a plurality of components are described below.

Referring to FIG. 4 of applicants' specification, as one example, channel 116 includes a plurality of components, such as, for instance, a channel processor 408, an internal PCI bus 406 from the processor to the adapter, and an adapter card 410 (e.g., a fibre channel adapter). The channel processor is responsible for interpreting the channel command words and moving data to and from host memory to channel memory 400. The PCI bus moves instructions and data from channel processor storage 400 to adapter 410. The fibre channel adapter moves instructions and data from the PCI bus to the external fabric attached control units 412. Depending on the type of

channel programs executed by the system, each of the three components of the channel may reach the limits of its capacity separately.

For example, small channel programs that include a few channel command words, but transfer a huge amount of data, have very little use of channel processor 408, but cause a very high utilization on internal PCI bus 406. However, a very long channel program that includes many channel command words, but only transfers very small amounts of data, requires very high utilization of the channel processor, but little use of the internal PCI bus and fibre channel adapter. Thus, no single number can adequately represent the channel utilization, since the components of the channel perform different tasks and can reach saturation at different points, depending on the nature of the I/O request for the applications using the channel. Further, many different applications can execute simultaneously on the channel, each with different characteristics and stressing different components of the channel at the same time. Therefore, in order for a customer to perform capacity planning and to correctly identify the resource of the channel that may be the bottleneck, each component of the channel is reported on separately. This allows the customer to identify the applications' I/O characteristics that can be added without saturating the channel, or that can be removed to avoid saturation.

In one particular aspect, applicants claim a method (e.g., claim 1) for determining utilization of channel components of a computing environment. The method includes, for instance, obtaining individualized measurement data for each component of selected multiple components of a plurality of components of a channel; and using said individualized measurement data to determine utilization of each component of at least two components of said selected multiple components. Thus, in applicants' claimed invention, measurement data is obtained for each component of selected multiple components of a channel and that measurement data is individual to each component. Further, the individualized measurement data is used to determine utilization of each component of at least two components of the selected multiple components. Thus, utilization is determined for particular components of a channel. This is very different from the teachings of Galbraith, Gutta or Patterson, either alone or in combination.

For example, Galbraith teaches obtaining a single utilization value for a channel, as a whole. This is explicitly stated throughout Galbraith. For instance, in the Abstract, it states: “Provides a method for measuring the busy utilization time for I/O channel used by any of plural operating systems (OSs) in a CEC.” The utilization time is measured for the entire I/O channel. Although Galbraith mentions a channel processor, the channel processor and the channel are considered one in the same in Galbraith. The channel utilization measured in Galbraith is for the whole channel. There is no discussion in Galbraith of the plurality of individual components that make up a channel. Galbraith simply treats the channel as a whole, and is not concerned with the individual components of the channel. There is no discussion in Galbraith of multiple components of a particular channel and obtaining utilization data for those multiple components.

The failure of Galbraith to describe, teach or suggest applicants’ claimed elements of obtaining individualized measurement data for each component of selected multiple components of a channel and using the individualized measurement data to determine utilization of each component of at least two components of the channel is explicitly admitted in the Office Action (see, e.g., pp. 2-3). Thus, Galbraith is combined with either Gutta or Patterson. However, neither Gutta nor Patterson overcomes the deficiencies of Galbraith.

Gutta, for instance, makes no mention of a channel or the individual components of a channel. Further, Gutta fails to describe, teach or suggest obtaining individualized measurement data for multiple components of a channel.

Instead, Gutta describes monitoring a PCI bus. While applicants’ channel includes, in one example, an internal PCI bus, the description in Gutta of a PCI bus is not a teaching or suggestion of a channel or the individual components of a channel. There is no mention in Gutta of a channel. There is no teaching or suggestion in Gutta of the specific components that would make up a channel. Since Gutta fails to describe, teach or suggest a channel or the multiple components of a channel, it follows that there is no teaching or suggestion in Gutta of obtaining individualized measurement data for each component of selected multiple components of a channel, as claimed by applicants.

Similarly, there is no teaching or suggestion in Patterson of a channel, as described by applicants, or of the individual components of a channel. Like Gutta, there is no teaching or

suggestion in Patterson of, at the very least, obtaining individualized measurement data for each component of selected multiple components of a channel, as claimed by applicants.

Since it is admitted in the Office Action that Galbraith fails to teach or suggest applicants' claimed element of obtaining individualized measurement data for each component of selected multiple components of a channel, and since neither Gutta nor Patterson make any mention of multiple components of a channel, much less obtaining measurement data for each component of the multiple components, applicants respectfully submit that, for at least this reason, the combination of the references fails to teach or suggest this claimed element. That is, since each reference fails to teach or suggest this claimed element, the combination also fails to teach or suggest this element.

It is indicated in the Office Action that both Gutta and Patterson are cited because they teach monitoring a bus. Applicants respectfully submit that the teaching of monitoring a bus is not a teaching or suggestion of obtaining individualized measurement data for each component of multiple components of a channel. The mere teaching of monitoring a bus is not a teaching or suggestion of monitoring a bus, when it is a part of a channel. There is no discussion in Gutta or Patterson of how to separate a bus from other components of a channel to measure utilization of just the bus. Further, there is no teaching or suggestion in Gutta or Patterson of individually monitoring multiple components of a channel. These aspects are not taught or suggested in any of the references. Again, Gutta and Patterson are not even concerned with channels, as described by applicants. Thus, Gutta and Patterson do not overcome the deficiencies of Galbraith.

Further, applicants respectfully submit that to state that Galbraith teaches measurement of a channel processor, and Gutta and Patterson teach monitoring a bus, and thus, one of ordinary skill in the art would combine those teachings to obtain applicants' invention, is hindsight reconstruction of applicants' invention. There is no recognition in any of the references of the problem addressed by applicants or how to address the problem. Again, none of the references even describes the plurality of components of a channel.

Moreover, there is no teaching or suggestion in the references themselves to combine the references. Yet further, there is no motivation to combine the references because there is no recognition in any of the references that a channel has multiple components or that the multiple

components should be individually monitored. It is applicants' invention that addresses individually monitoring components of a channel. Prior to applicants' invention, the channel was measured as one entity. None of the references, either alone or in combination, recognizes the problem addressed by applicants or addresses that problem. None of the references, either alone or in combination, teaches or suggests applicants' claimed invention.

Based on the foregoing, applicants respectfully submit that independent claim 1, and similar independent claims, are patentable over the combination of Galbraith in view of Gutta or Patterson. The dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features. The additionally cited art, Blasciak and LANQuest do not overcome the deficiencies of any of the other cited art. As a matter of fact, LANQuest specifically describes a system level task in which they do not attempt to isolate and measure individual variables. This is the opposite of applicants' claimed invention. Thus, applicants respectfully request an indication of allowability for claim 1, any similar independent claims, and all claims that depend therefrom.

In a further aspect, applicants claim a method of determining utilization of channels of a computing environment, in which the computing environment includes a plurality of logical partitions (e.g., claim 20). The method includes, for instance, obtaining, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, the measurement data being representative of use of the channel by the logical partition and representative of use by one or more other logical partitions of the plurality of logical partitions; and using the measurement data to determine utilization of the channel. Thus, in this aspect of applicants' claimed invention, the measurement data obtained on behalf of a particular logical partition is measurement data representative of use by a plurality of logical partitions (e.g., the logical partition involved in determining the utilization, as well as one or more other logical partitions). This is very different from the teachings of Galbraith, Gutta and Patterson, either alone or in combination.

Although Galbraith teaches a plurality of logical partitions, Galbraith does not teach or suggest that measurement data obtained on behalf of a particular logical partition is representative of use by multiple logical partitions. Instead, in Galbraith, the measurement data

for each logical partition is exclusive for that logical partition. This is explicitly stated in Galbraith. For example, in Col. 2, lines 12-14, it is stated: "The two OSs must be provided measurements which do not indicate the other OSs use of the shared I/O resources." Therefore, the measurements provided in Galbraith are for a single operating system (i.e., a single logical partition), and not for multiple logical partitions, as claimed by applicants. Thus, applicants respectfully submit that Galbraith does not describe, teach or suggest applicants' claimed invention.

Applicants respectfully submit that they are not simply claiming measuring the utilization for each logical partition, but instead, explicitly claiming that the measurement data obtained for a particular logical partition is representative of use of the channel by multiple logical partitions. That is, the measurement data is representative of use of the channel by the logical partition involved in determining utilization of the channel, as well as use by one or more other logical partitions. There is no description, teaching or suggestion in Galbraith that the measurement data being obtained for a particular logical partition represents a plurality of logical partitions. Instead, in Galbraith, each logical partition only obtains the information for that particular logical partition.

Moreover, neither Gutta nor Patterson overcomes the deficiencies of Galbraith. Neither Gutta nor Patterson makes any mention whatsoever of logical partitions or of obtaining measurement data for logical partitions. Thus, neither Gutta nor Paterson teaches or suggests, at the very least, applicants' claimed element of obtaining, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, in which the measurement data is representative of use of the channel by the logical partition and representative of use by one or more other logical partitions.

Since Galbraith does not describe, teach or suggest obtaining, on behalf of a logical partition involved in determining utilization of a channel, measurement data for the channel, the measurement data being representative of use of the channel by the logical partition and representative of use by one or more other logical partitions, and since Gutta and Patterson fail to even mention a logical partition, applicants respectfully submit that the combination of the references does not teach or suggest applicants' claimed invention. Thus, applicants respectfully

request an indication of allowability for claim 20, any similar independent claims, and all claims that depend therefrom.

For all of the above reasons, applicants respectfully request an indication of allowability for all pending claims. Should the Examiner wish to discuss this case with applicants' attorney, please contact applicants' attorney at the below listed number.

Respectfully submitted,

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